

4. Claims:

- (1) A motion picture data processing device, comprising:

inputting means for inputting motion picture data that has been subjected to compression including frequency transformation and quantization;

watermark embedding means for generating and embedding a pattern of a visible watermark corresponding to a motion compensated prediction in said motion picture data input by said inputting means; and

outputting means for outputting motion picture data with a watermark embedded therein by said watermark embedding means.

- (2) The motion picture data processing device according to Claim 1, wherein said watermark embedding means comprises:

intra-block processing means for embedding said digital watermark pattern into blocks that have pixel values relevant to all pixels as information among screens constituting said motion picture data; and

motion correction means for embedding a cancellation pattern for canceling the movement of said digital watermark pattern due to motion vectors into a screen that is generated through motion compensated prediction based on motion vectors among screens constituting said motion picture data.

- (3) The motion picture data processing device according to Claim 2, wherein said motion correction means generates an image of said cancellation pattern, subjects it to frequency transformation, and embeds it in a screen being processed.

- (4) The motion picture data processing device according to Claim 2, wherein said motion correction means prepares in advance

pattern tables for possible cancellation patterns that have been frequency-converted, and selects and embeds an appropriate pattern table in a screen being processed.

- (5) A motion picture data processing device, comprising:

dequantization means for dequantizing motion picture data that has been subjected to compression including DCT (discrete cosine transform) and quantization;

watermark embedding means for embedding a pattern of a watermark converted into a DCT coefficient in said motion picture data dequantized by said dequantization means; and

quantization means for quantizing motion picture data with a watermark embedded therein by said watermark embedding means.

- (6) The motion picture data processing device according to Claim 5, wherein said watermark embedding means comprises:

intra-block processing means for converting the image of said digital watermark pattern to DCT coefficients and embedding them into screens that have pixel values relevant to all pixels as information among screens constituting said motion picture data; and

motion correction means for embedding a said digital watermark pattern for which the effect of motion vectors are canceled into a screen that is generated through motion compensated prediction based on motion vectors among screens constituting said motion picture data.

- (7) The motion picture data processing device according to Claim 6, wherein said motion correction means generates an image of said digital watermark pattern based on said motion vectors, converts it into DCT coefficients, and embeds them into a screen being processed.

(8) The motion picture data processing device according to Claim 6, wherein said motion correction means prepares in advance pattern tables that show DCT coefficients produced by converting images of possible said digital watermark patterns, and selects and embeds an appropriate pattern table into a screen being processed.

(9) A motion picture data processing device, comprising:

input means for inputting motion picture data that has been subjected to compression including DCT (discrete cosine transform) and quantization;

watermark embedding means for embedding a pattern of a watermark converted into a DCT coefficient and then quantized in said motion picture data input by said inputting means; and

outputting means for outputting motion picture data with a watermark embedded by said watermark embedding means.

(10) The motion picture data processing device according to Claim 9, wherein said watermark embedding means comprises:

intra-block processing means for converting an image of said digital watermark pattern into DCT coefficients and quantizing them before embedding them in screens that have pixel values relevant to all pixels as information among screens constituting said motion picture data; and

motion correction means for embedding said digital watermark pattern for which the effect of motion vectors is canceled into a screen that is generated through motion compensated prediction based on motion vectors among screens constituting said motion picture data.

- (11) A motion picture processing method for embedding a watermark in motion picture data that has been subjected to compression including frequency transformation and quantization by using a computer, comprising:

a first step of inputting motion picture data that has been subjected to said compression and storing the data in predetermined storing means;

a second step of embedding a pattern of a visible watermark corresponding to a motion compensated prediction in said motion picture data stored in said predetermined storing means and storing the data in predetermined storing means; and

a third step of outputting said motion picture data with a watermark embedded therein and stored in said predetermined storage means.

- (12) The motion picture data processing method according to Claim 11, wherein said second step comprises the step of:

generating an image of a cancellation pattern for canceling the movement of said digital watermark pattern due to motion vectors for a screen that is generated through motion compensated prediction based on motion vectors among screens constituting said motion picture data and storing it in predetermined storage means; and

subjecting said image stored in said predetermined storage means to frequency transformation and embedding it in a screen being processed.

- (13) The motion picture data processing method according to Claim 11, wherein said second step comprises the steps of:

determining whether it is necessary to embed a cancellation pattern for canceling the movement of said digital watermark pattern due to motion vectors into a screen that is generated through motion compensated prediction that is based on motion vectors among screens constituting said motion picture data on the basis of motion vectors for that screen; and

if it is determined that it is necessary to embed said cancellation pattern, selecting an appropriate pattern table from a group of pattern tables that store frequency-converted values of possible said cancellation patterns as stored in predetermined storing means and embedding it into a screen being processed.

- (14) A motion picture data processing method for removing a watermark embedded in motion picture data that has been subjected to compression including frequency transformation and quantization by using a computer, comprising the steps of:

dequantizing said motion picture data that has been subjected to compression and storing the data in predetermined storing means;

removing a pattern of a visible watermark corresponding to a motion compensated prediction embedded in said motion picture data dequantized and stored in said predetermined storing means and storing the data in predetermined storing means;

quantizing said motion picture data with a watermark removed and stored in said predetermined storing means.

- (15) A program product for embedding a watermark in motion picture data that has been subjected to compression including frequency transformation and quantization by controlling a computer, wherein said program causes said

computer to perform:

a first process for inputting motion picture data that has been subjected to said compression and storing the data in predetermined storing means;

a second process for embedding a pattern of a visible watermark corresponding to a motion compensated prediction in said motion picture data stored in said predetermined storing means and storing the data in predetermined storing means; and

a third process for quantizing said motion picture data with a watermark embedded therein and stored in said predetermined storing means.

- (16) The program product according to Claim 15, wherein said second process comprises the processes of:

embedding said digital watermark pattern into screens that have pixel values relevant to all pixels as information among screens constituting said motion picture data; and

embedding a cancellation pattern for canceling the movement of said digital watermark pattern due to motion vectors into a screen that is generated through motion compensated prediction based on motion vectors among screens constituting said motion picture data.

- (17) The program product according to Claim 16, wherein said process of embedding a cancellation pattern comprises the processes of:

generating an image of a cancellation pattern for canceling the movement of said digital watermark pattern due to motion vectors for a screen that is generated through motion compensated prediction based on motion vectors among screen

subjecting said image stored in said predetermined storage means to frequency transformation and embedding it in a screen being processed.

- (18) The program product according to Claim 16, wherein said process of embedding a cancellation pattern comprises the processes of:

determining whether it is necessary to embed a cancellation pattern for canceling the movement of said digital watermark pattern due to motion vectors into a screen that is generated through motion compensated prediction that is based on motion vectors among screens constituting said motion picture data on the basis of motion vectors for that screen; and

if it is determined that it is necessary to embed said cancellation pattern, selecting an appropriate pattern table from a group of pattern tables that store frequency-converted values of possible said cancellation patterns as stored in predetermined storing means and embedding it into a screen being processed.

- (19) A program product for removing a watermark from motion picture data that has been subjected to compression including frequency transformation and quantization by controlling a computer, wherein said program causes said computer to perform:

a process for dequantizing motion picture data that has been subjected to said compression and storing the data in predetermined storing means;

a process for removing a pattern of a visible watermark corresponding to a motion compensated prediction embedded in said motion picture data dequantized and stored in said predetermined storing means and storing the data in

predetermined storing means; and

a process for quantizing said motion picture data with a watermark removed and stored in said predetermined storing means.